



SLOVENSKI STANDARD SIST EN ISO 9875:2000

01-december-2000

Ships and marine technology - Marine echo-sounding equipment (ISO 9875:1996)

Ships and marine technology - Marine echo-sounding equipment (ISO 9875:1996)

Schiffe und Meerestechnik - Echolote für die Schifffahrt (ISO 9875:1996)

Navires et technologie maritime - Appareils de sondage par écho (ISO 9875:1996)

Ta slovenski standard je istoveten z: EN ISO 9875:1997

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ICS:

47.020.70	Navigacijska in krmilna oprema	Navigation and control equipment
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 9875

December 2001

ICS 47.020.70

Supersedes EN ISO 9875:1997

English version

**Ships and marine technology - Marine echo-sounding
equipment (ISO 9875:2000)**

Navires et technologie maritime - Appareils de sondage par
écho (ISO 9875:2000)

Schiffe und Meerestechnik - Echolote für die Schifffahrt
(ISO 9875:2000)

This European Standard was approved by CEN on 12 November 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN ISO 9875:2001 (E)

Foreword

The text of the International Standard from Technical Committee ISO/TC 8 "Ships and marine technology" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 300 "Sea-going vessels and marine technology", the secretariat of which is held by DIN.

This European Standard supersedes EN ISO 9875:1997.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2002, and conflicting national standards shall be withdrawn at the latest by June 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CMC: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

Endorsement notice

The text of the International Standard ISO 9875:2000 has been approved by CEN as a European Standard without any modification.

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INTERNATIONAL STANDARD

ISO
9875

Second edition
1996-08-01

Ships and marine technology — Marine echo-sounding equipment

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Reference number
ISO 9875:1996(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9875 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation*.

This second edition cancels and replaces the first edition (ISO 9875:1991), which has been technically revised.

Annex A forms an integral part of this International Standard. Annex B is for information only.

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Ships and marine technology — Marine echo-sounding equipment

1 Scope

This International Standard specifies the performance and type testing of marine echo-sounding equipment required by Regulation 12 of Chapter V of the *International Convention for the Safety of Life at Sea, 1981* (SOLAS 1981) as amended.

It establishes, when used in conjunction with IEC 945, minimum performance standard test methods and required test results for marine echo-sounding equipment which measures the depth of water under a ship by transmitting pulsed acoustic energy and timing the return of the echo from the sea-bed.

Clause 4 gives the performance requirements, based on IMO Resolution A.224(VII).

Clause 5 consists of the test methods and the required test results.

All requirements (with the exception of numerical values and their units) that are extracted from the recommendations of IMO Resolution A.224(VII) are printed in italics.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 945:1994, *Marine navigational equipment — General requirements — Methods of testing and required test results*.

International Convention for the Safety of Life at Sea (SOLAS 1981), Chapter V, Regulation 12: Shipborne navigational equipment.

IMO Resolution A.224(VII), *Performance standards for echo-sounding equipment*.

IMO Resolution A.694(17), *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 source level, S : Maximum rms (root-mean-square) sound pressure level, expressed in decibels relative to 1 μPa , at a point on the principal axis of the transducer, as measured in the far field but referred to the distance of 1 m.

3.2 directivity index, D : Ratio, expressed in decibels, of the acoustic power density at a distant point on the principal axis of the transducer, when used as a transmitter, to that of an omnidirectional transducer, with the same total radiated acoustic power.

3.3 receiving bandwidth, B : $10 \log_{10} (f_1 - f_2)$, expressed in decibels relative to 1 Hz, where f_1 and f_2 are the upper and lower frequencies respectively in hertz at which the response of the overall system, measured through water, is 3 dB below the maximum response of the system.

3.4 minimum detectable signal-to-noise ratio, E : Ratio, expressed in decibels, of the signal level to the background noise level in the bandwidth of the receiver required to give a minimum detectable signal on the display.

4 Requirements

4.1 General requirements

4.1.1 General requirements of the echo-sounding equipment shall be in accordance with IEC 945:1994, clause 3.

4.1.2 *The echo-sounding equipment shall provide reliable information on the depth of water under a ship to aid navigation.*

4.1.3 If an acoustic depth alarm is fitted, the acoustic signal emitter shall be tested. During this test, the functions of the echo-sounding equipment shall not be affected. When numerical displays conforming to IEC 945:1994, subclause 3.2.7.1, are used, this test may be combined with segment testing.

4.2 Range of depths

Under normal propagation conditions, the equipment shall be capable of measuring any clearance under the transducer between 2 m and 400 m.

4.3 Range scales

4.3.1 *The equipment shall provide a minimum of two range scales, one of which, the deep range, shall cover the whole depth range, and the other, the shallow range, the first one-tenth of the range.*

4.3.1.1 Range scales in addition to those required in 4.3.1 may be provided.

4.3.1.2 Positive indication of the range in use shall be provided in all cases.

4.3.1.3 Where phased ranges, not starting from zero, are available, an indication shall be provided to show when such a range is in use.

4.3.2 *The scale of display shall not be smaller than 2,5 mm per metre depth on the shallow range scale and 0,25 mm per metre depth on the deep range scale.*

4.4 Method of presentation

4.4.1 *The primary presentation shall be a graphical display which provides the immediate depth and a visible record of soundings. Other forms of display may be added but these shall not affect the normal operation of the main display.*

4.4.2 *The record shall, on the deep range scale, show at least 15 min of soundings.*

4.4.3 *Where paper is used for recording depth on the graphical display, either by marks on the recording paper, or by other means, there shall be a clear indication when the paper remaining is less than approximately 10 % of the original roll length.*

4.4.4 The equipment shall have the function of displaying time in time mark at an interval of 3 min or less. The accuracy shall be ± 5 %.

4.5 Safety

In the case of equipment using a high voltage electro-sensitive recording medium and/or a moving writing mechanism, and where access to the record is possible while the echo-sounding equipment is operating, the equipment shall provide for operator safety.

4.6 Pulse repetition rate

The pulse repetition rate shall not be slower than 12 pulses per minute.

4.7 Measurement accuracy

4.7.1 *Based on a sound speed in water of 1 500 m/s, the allowable tolerance on the indicated depth shall be either*

± 1 m on the shallow range scale, and

± 5 m on the deep range scale;

or

± 5 % of the indicated depth,

whichever is the greater.

NOTE 1 These tolerances take no account to ship roll and pitch.

4.7.2 Where a set zero control is provided, this shall be for use in calibration and installation and shall not be made available as an operator control.

4.7.3 Where depth measurement relative to the sea surface is provided, in addition to measurement of the depth of water under the ship, there shall be positive indication of the mode of operation in use.

4.8 Roll and pitch

The performance of the equipment shall be such that it will meet the requirements of this International Standard when the ship is rolling $\pm 10^\circ$ and/or pitching $\pm 5^\circ$.

4.9 Power supply

The power supply of the equipment shall be in accordance with IEC 945:1994, subclause 3.3.

4.10 Environmental conditions

Weatherproofing and exposure-to-weather integrity of the equipment shall be in accordance with IEC 945:1994, subclause 3.4.

4.11 Interference

The equipment shall comply with the requirements for interference given in IEC 945:1994, subclause 3.5.

it. Initially, the transducer shall be directed towards the calibrated hydrophone.

NOTE 2 See [1], [2] and [3] for details.

In order to minimize near-field effects, distance d , in metres, shall not be less than

$$1,25a^2f/c$$

where

- a is the largest active dimension of the transducer element, in metres, appropriate to the mode of use i.e. transmission or reception (usually the same figure for either);
- f is the highest operation frequency of the echo-sounding equipment in hertz;
- c is the sound speed in water, equal to 1 500 m/s (see 4.7.1).

Precautions shall be taken to minimize the effects of reverberation in the water. These precautions shall include the use of gated pulse measurement techniques. These techniques will be essential in the case of some echo-sounding equipment receivers that operate in a non-linear mode.

5 Test methods and required test results

5.1 General

Any requirement in clause 4 for which no test is specified in this clause or in IEC 945:1994, clause 4, shall be checked by inspection of the equipment, the manufacturer's drawings or the relevant documents. The result of the inspection shall be stated in the test report.

5.2 General underwater test conditions

The equipment transducer in its housing, complete with acoustic window if provided, shall be attached underwater to a clamp calibrated in degrees to enable the transducer to be rotated to any required angle about the major axis of the face of its element (i.e. about the longer axis, which will run parallel to the ship fore-and-aft line) and about the minor axis (the athwartships axis) where the element is rectangular or elliptical, or about any facial axis where the element is circular.

A calibrated hydrophone, which can be replaced by a calibrated projector (or, alternatively, a single instrument capable of being used in either role as required) shall be mounted under the water as a suitable known distance, d , from the transducer and directed towards

5.3 Range of depths

5.3.1 Minimum depth indication

5.3.1.1 Test method

The transducer in its housing, complete with acoustic window if provided, shall be normally connected and immersed in water with its axis of maximum response directed towards (i.e. normal to) an echoing boundary surface such as the bottom or side of the tank holding the water. It shall be possible to adjust and to measure the physical distance between the transducer and the boundary surface from 0 to not less than 2 m.

The test shall be conducted such that no other object or discontinuity shall be capable of affecting the result significantly.

The equipment shall be set to the shallow scale with the longest pulse length available on that scale and the physical distance between the transducer and the boundary surface shall be adjusted until the echo from this surface is just indicated separately and distinctly on the display. This physical distance shall be measured and noted as the minimum depth indication.

5.3.1.2 Result required

The minimum depth indication shall not be greater than 2 m.

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